Alberta
HUMAN RESOURCES AND EMPLOYMENT

the people & workplace department

Labour Productivity in Alberta

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Data Development and Evaluation

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This document has been prepared to provide information on the importance of productivity and its effect on economic growth.

For the official productivity numbers, please refer to the Alberta Economic Development website:
http://www.alberta-canada.com/index.cfm
and Alberta Finance website:
http://www.finance.gov.ab.ca/aboutalberta/alberta_statistics.html

Labour Productivity in Alberta

Introduction

The following profile presents current information on labour productivity in Alberta, and compares Alberta's labour productivity with that of the other provinces.

Productivity is the relationship between the output of goods and services, such as the Gross Domestic Product (GDP), and the input of resources, both human and non-human, used in the production process. This relationship is usually expressed in ratio form. The most widely used measure of productivity is labour productivity, the ratio of output to some measure of labour input. In terms of productivity concepts, it is important to distinguish between:

- **Output per worker and output per hour**: Labour input can be measured either in terms of the average annual number of workers or in terms of the total number of hours worked in a year. The latter is a more appropriate measure of labour productivity, as it represents a more precise calculation of labour input.

- **Productivity levels and productivity growth rates**: For example, *good productivity performance* can refer to a high level of labour productivity or a rapid growth in labour productivity. Productivity levels are defined as the amount of output per unit of input at a point in time while productivity growth rates are the percent change in productivity levels between two points in time.

- **Labour productivity and total or multi-factor productivity**: Labour productivity is a partial measure of productivity, relating a single input, labour, to output. Total or multi-factor productivity measures relate output to an index of two or more inputs. It refers to output that is unaccounted for by the combination of labour and capital in a production function. It reflects many factors, including educational attainment of the workers in the labour force, the degree of business competition, managerial practices, and government regulations.

  Although labour productivity does reflect intensity of effort, it also represents the influence of all factors that affect productivity, such as the amount of capital available to a worker or the level of production of technology. The concept of total factor productivity has been developed to measure the contribution of these factors of production to productivity growth. However, for the purposes of this report, the measure of labour productivity will be used.

Productivity is important as it directly affects the bottom line of an organization, as higher levels of productivity generally result in an increase in profits. Furthermore, economic growth can be divided into productivity growth and employment or labour force growth. In the long term, however, productivity growth is the only way to increase real income, and thus improve the standard of living, defined as real GDP per capita.

Sharpe (1998) believed that a better understanding of productivity trends would be beneficial and could help direct public policies and private-sector actions to improve productivity performance.

Sharpe (1998) identifies several determinants for productivity growth:

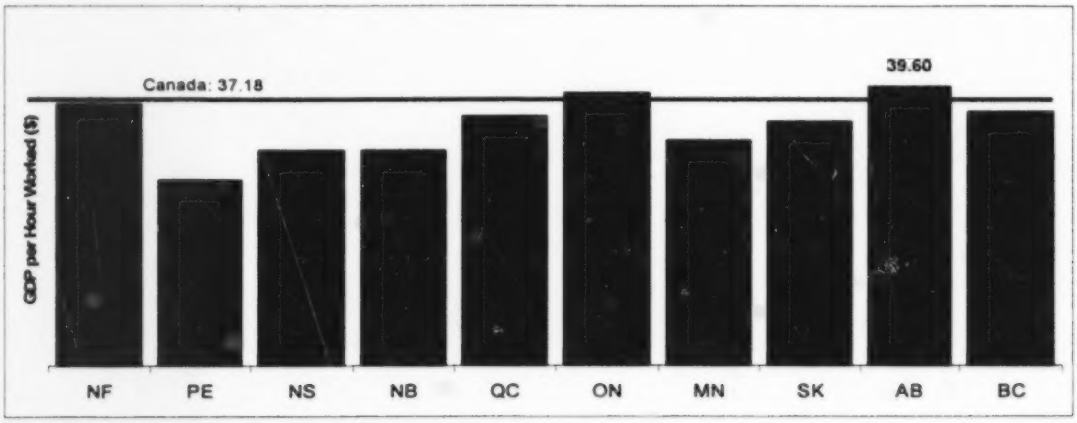
- **The rate of technical progress**, determined by the rate of developing new product and process innovations.
- **Investment in physical capital** such as machinery and equipment and structures. The more capital available to a worker, the greater the output he/she can produce.
- **The quality of the workforce**, including education, training and experience levels. Literacy and technical skills are essential for an industry to benefit from technical advances.
- **The size and quality of the natural resource base**. For example, the high level of output per hour in Alberta reflects the concentration of the Oil and Gas industry and the high value added (which includes high economic rent) per worker generated by the industry.
- **Industrial structure and intersectoral shifts**, since the labour productivity is a weighted average of industry labour productivity levels, where the weights are the labour input shares.
- **The macroeconomic environment** or aggregate demand conditions as defined by the size of the output gap and the relationship between actual and potential output growth.
- **The microeconomic policy environment** or the policies that affect behaviour at the firm level including trade policy, tax policy, industrial policy, competition policy, and policies on privatization, intellectual property, regulation and foreign ownership.

Many of the factors that affect productivity growth are interrelated and may act in synergy.

Real GDP per Hour Worked

Figure 1 shows that, in 2004, Alberta had the highest productivity level in Canada, measured in real GDP per hour worked, at $39.60 Canadian. The national average was $37.18 Canadian.

Figure 1- Canada and Provinces, Real GDP per Hour Worked, in 1997 constant dollars, 2004

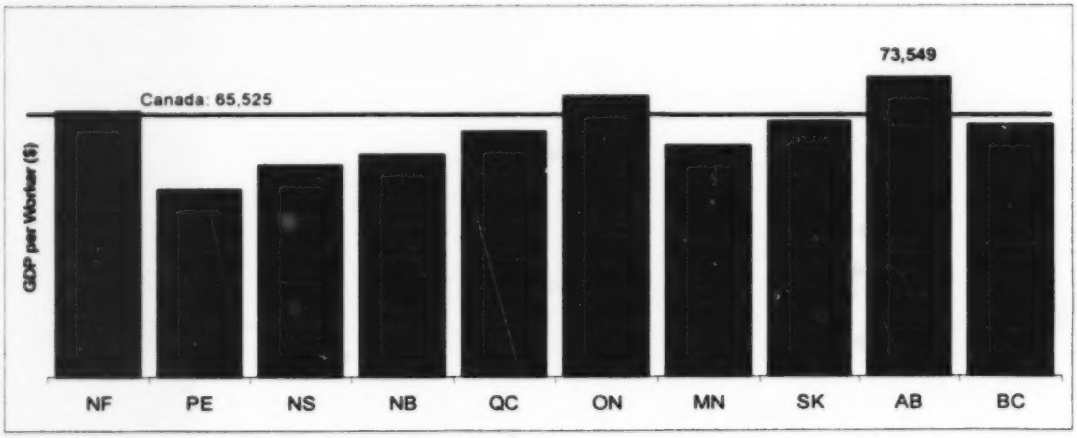


Source: Centre for the Study of Living Standards (CSLS)

Real GDP per Worker

Figure 2 illustrates that Alberta also had the highest productivity level when measured in real GDP per worker, at $73,549 Canadian. The national average was $65,525 Canadian.

Figure 2- Canada and Provinces, Real GDP per Worker, in 1997 constant dollars, 2004



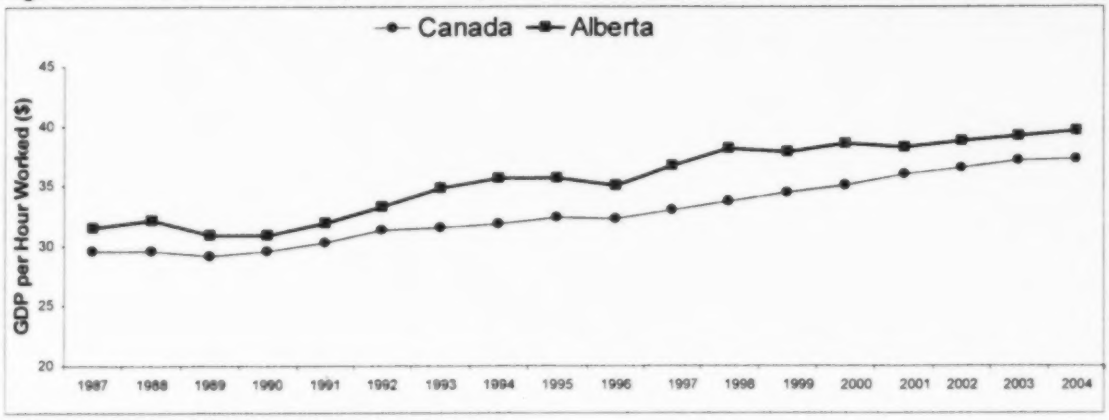
Source: Centre for the Study of Living Standards (CSLS)

Alberta's high productivity level likely reflects the concentration of the Oil and Gas industry in this province and the high value added per worker generated by that industry.

Canada and Alberta, Real GDP per Hour Worked

Figure 3 demonstrates that, since 1987, both Canada and Alberta's productivity levels, measured in real GDP per hour worked, have increased. Alberta has seen consistent growth since 1996.

Figure 3- Canada and Alberta, Real GDP per Hour Worked, in 1997 constant dollars, 1987-2004

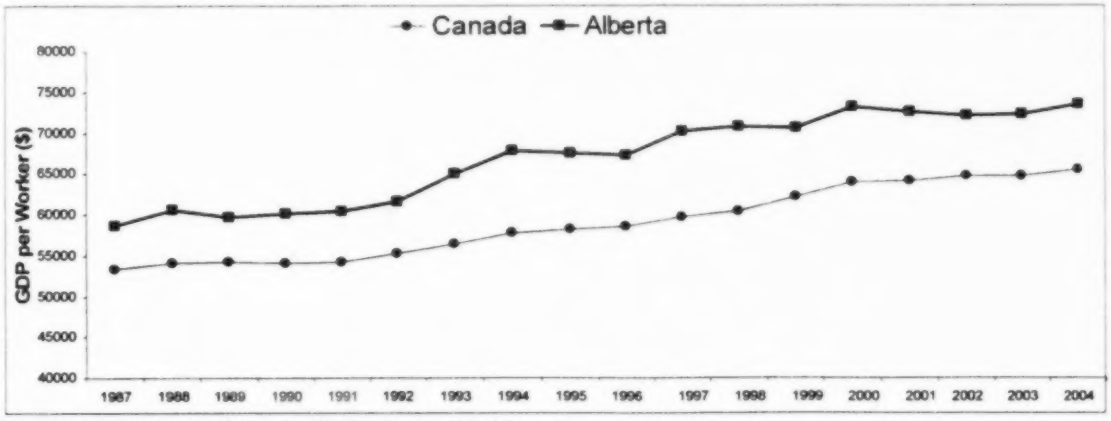


Source: Centre for the Study of Living Standards (CSLS)
Note: Historical data listed in Appendix A

Canada and Alberta, Real GDP per Worker

Figure 4 shows that, since 1987, both Canada and Alberta's productivity, measured in real GDP per worker, has increased. Canada saw an increase in average productivity in 2004 of $802 per worker, while Alberta's average productivity rose by $1,208 per worker in 2004.

Figure 4- Canada and Alberta, Real GDP per Worker, in 1997 constant dollars, 1987-2004

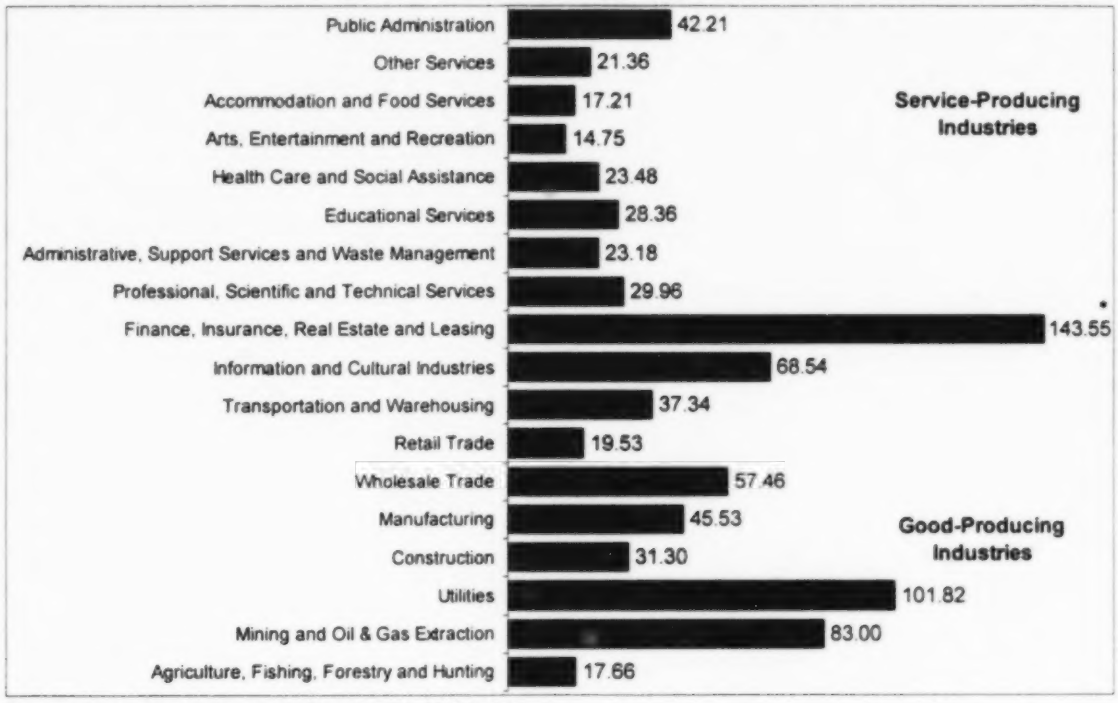


Source: Centre for the Study of Living Standards (CSLS)
Note: Historical data listed in Appendix A

Real GDP per Hour Worked by Industry

Figure 5 shows a comparison of selecied industries within Alberta. In 2004, those industries with the highest productivity, measured in real GDP per hour worked, were: (1) Finance, Insurance, Real Estate, and Leasing at $143.55 Canadian; (2) Utilities at $101.82 Canadian ; and (3) Mining and Oil & Gas Extraction at $83.00 Canadian.

Figure 5- Alberta, Real GDP per Hour Worked by Industry, in 1997 constant dollars, 2004

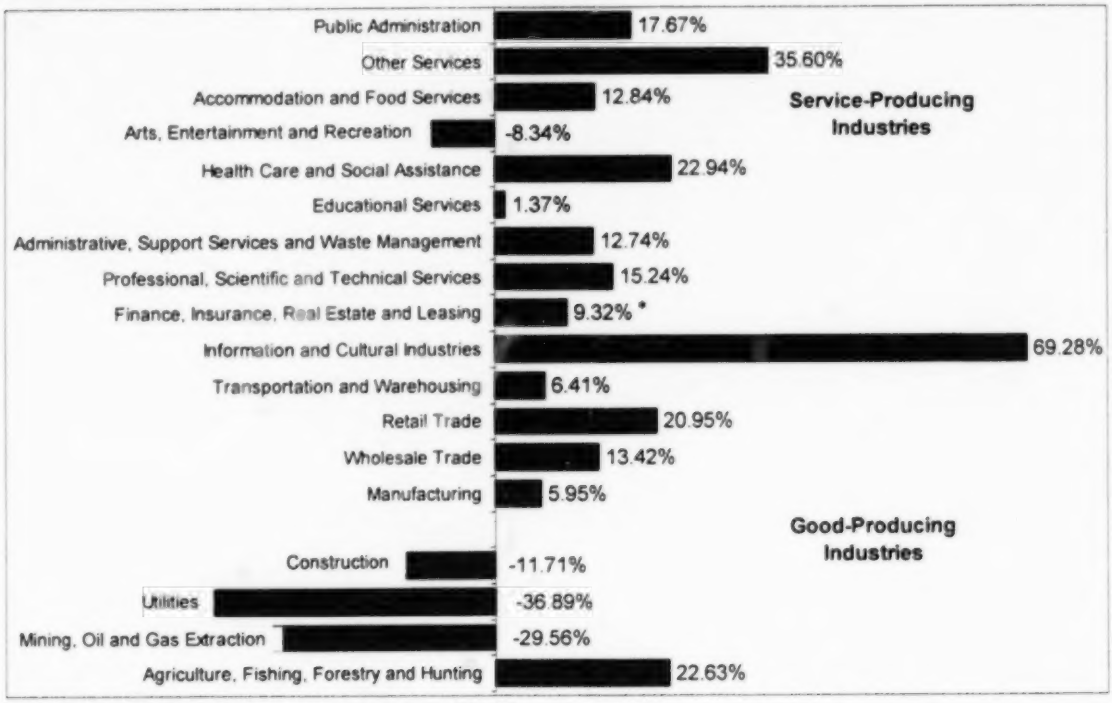


Source: Centre for the Study of Living Standards (CSLS)
Note: Historical data listed in Appendix B
* Estimated data due to confidentiality requirements of this specific industry

Real GDP per Hour Worked Growth by Industry

Figure 6 illustrates the real GDP per hour worked growth by industry between 1998 and 2004. Those industries which experienced the highest positive growth were: (1) Information and Cultural Industries, 69.28%; (2) Other Services, 35.60%; and (3) Health Care and Social Services, 22.94%. Those industries which experienced the highest negative growth were: (1) Utilities, -36.89%; (2) Mining, Oil and Gas Extraction, -29.56%; and (3) Construction, -11.71%.

Figure 6- Alberta, Real GDP per Hour Worked Growth by Industry, in 1997 constant dollars, 1998 - 2004

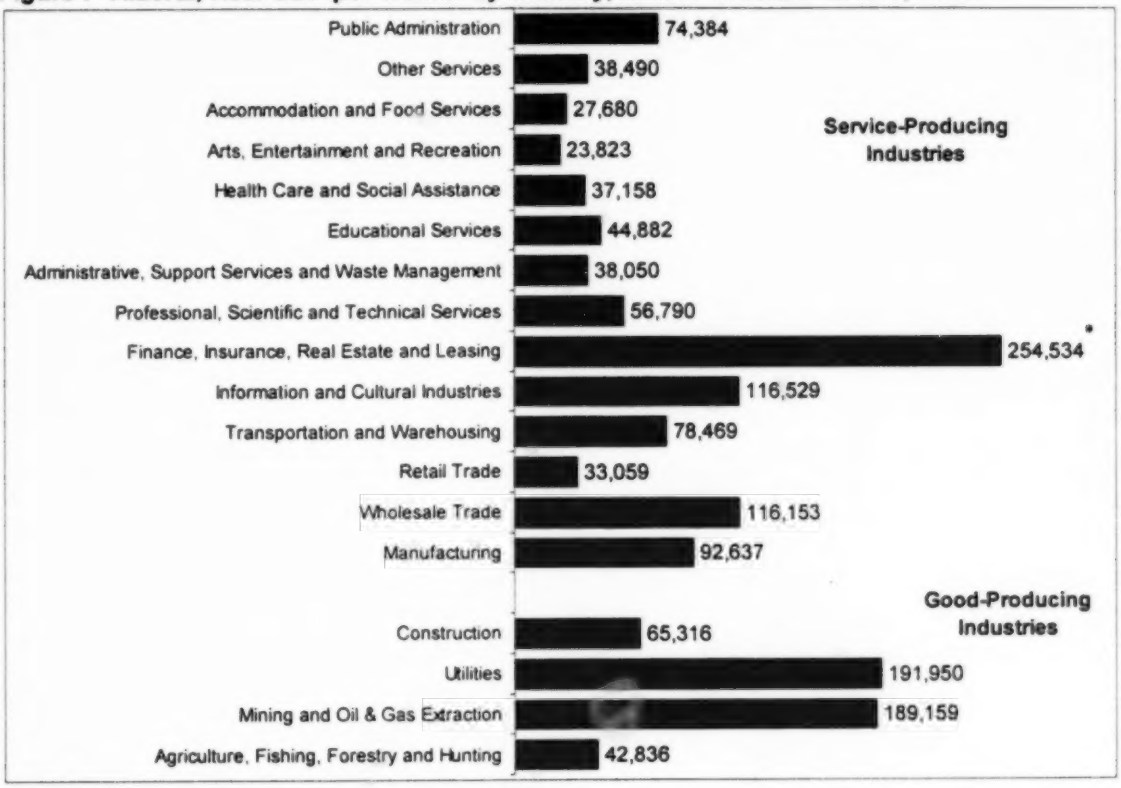


Source: Centre for the Study of Living Standards (CSLS)
Note: Historical data listed in Appendix B
* Estimated data due to confidentiality requirements of this specific industry

Real GDP per Worker by Industry

Figure 7 shows a comparison of industries within Alberta. In 2004, those industries with the highest productivity, measured in real GDP per worker, were: (1) Finance, Insurance, Real Estate, and Leasing at $254,534 Canadian; (2) Utilities at $191,950 Canadian; and (3) Mining and Oil & Gas Extraction at $189,159 Canadian.

Figure 7- Alberta, Real GDP per Worker by Industry, in 1997 constant dollars, 2004

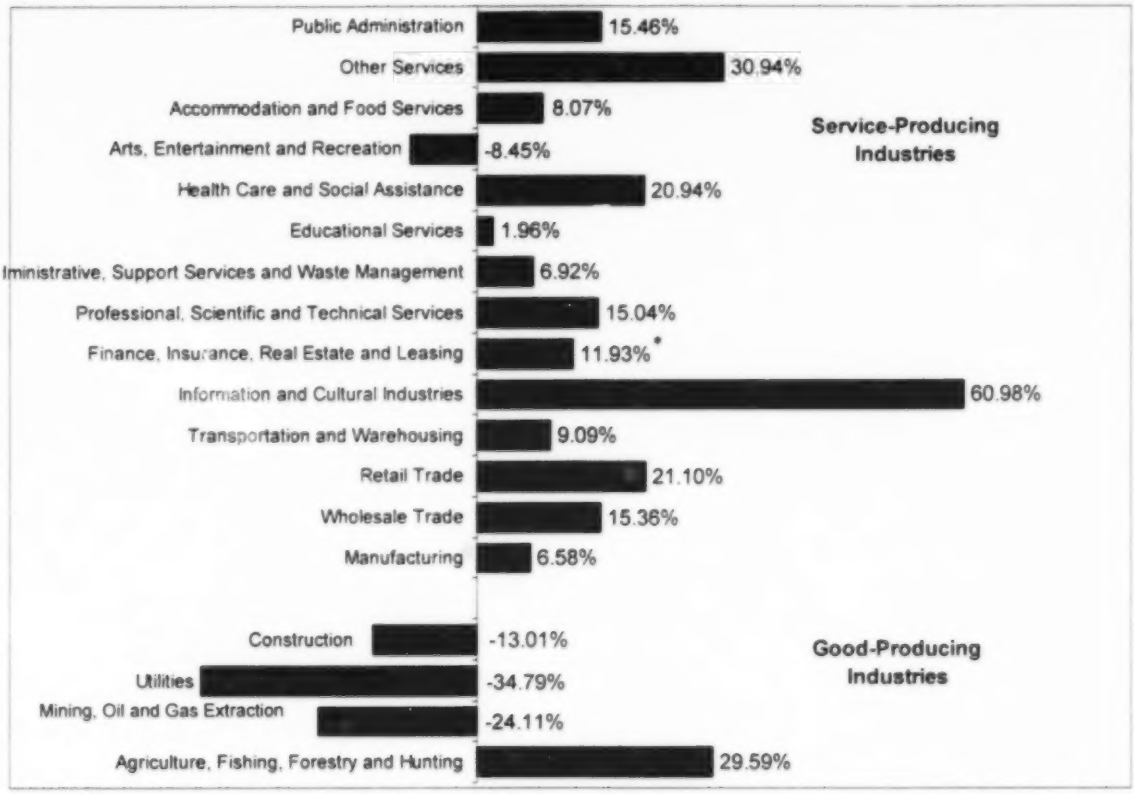


Source: **Centre for the Study of Living Standards (CSLS)**
Note: Historical data listed in Appendix B
* Estimated data due to confidentiality requirements of this specific industry

Real GDP per Worker Growth by Industry

Figure 8 illustrates the real GDP per worker growth by industry between 1998 and 2004. Those industries which experienced the highest positive growth were: (1) Information and Cultural Industries, 60.98%; (2) Other Services, 30.94%; and (3) Agriculture, Fishing, Forestry and Hunting, 29.59%. Those industries which experienced the highest negative growth were: (1) Utilities, -34.79%; (2) Mining, Oil and Gas Extraction, -24.11%; and (3) Construction, -13.01%.

Figure 8- Alberta, Real GDP per Worker Growth by Industry, in 1997 constant dollars, 1998 and 2004



Source: Centre for the Study of Living Standards (CSLS)
Note: Historical data listed in Appendix B
* Estimated data due to confidentiality requirements of this specific industry

Glossary

Real Gross Domestic Product (GDP): The total market value of all goods and services produced within Canada during a given year. It is a measure of the income generated by production within Canada. GDP is also referred to as economic output . To avoid counting the same output more than once, GDP includes only final goods and services - not those that are used to make another product.

Constant Dollars: A measure used to express real prices. Real prices are those that have been adjusted to remove the effect of changes in the purchasing power of the dollar; they usually reflect buying power relative to a reference year.

Appendix A

Canada and Alberta Real GDP per Hour Worked in 1997 constant dollars, 1987-2004

1987	$29.62	$31.50
1988	$29.52	$32.16
1989	$29.19	$30.88
1990	$29.57	$30.96
1991	$30.24	$31.91
1992	$31.30	$33.22
1993	$31.50	$34.84
1994	$31.84	$35.59
1995	$32.34	$35.61
1996	$32.28	$35.06
1997	$32.92	$36.71
1998	$33.65	$38.08
1999	$34.36	$37.84
2000	$35.05	$38.48
2001	$35.90	$38.17
2002	$36.49	$38.74
2003	$37.09	$39.17
2004	$37.18	$39.60

Source: Centre for the Study of Living Standards (CSLS)

Canada and Alberta Real GDP per Worker in 1997 constant dollars, 1987-2004

	Canada	Alberta
1987	$53,377	$58,629
1988	$54,097	$60,616
1989	$54,204	$59,647
1990	$54,102	$60,095
1991	$54,273	$60,511
1992	$55,301	$61,579
1993	$56,379	$65,095
1994	$57,732	$67,870
1995	$58,229	$67,524
1996	$58,523	$67,210
1997	$59,720	$70,291
1998	$60,518	$70,763
1999	$62,271	$70,637
2000	$63,945	$73,251
2001	$64,203	$72,539
2002	$64,795	$72,082
2003	$64,723	$72,341
2004	$65,525	$73,549

Source: Centre for the Study of Living Standards (CSLS)

Appendix B

Alberta Real GDP per Hour Worked by Industry in 1997 Constant Dollars, 1998-2004

	1998	1999	2000	2001	2002	2003	2004
All Industries	$38.08	$37.84	$38.48	$38.17	$38.74	$39.17	$39.60
Agriculture, Fishing, Forestry and Hunting	$14.40	$17.37	$19.94	$19.08	$15.66	$16.70	$17.66
Mining and Oil & Gas Extraction	$117.83	$130.29	$116.07	$87.21	$92.61	$89.07	$83.00
Utilities	$161.35	$145.40	$119.62	$119.43	$85.88	$96.10	$101.82
Construction	$35.45	$32.08	$35.03	$36.05	$33.50	$33.44	$31.30
Manufacturing	$42.97	$39.63	$44.66	$42.81	$41.12	$43.03	$45.53
Wholesale Trade	$50.66	$40.71	$41.43	$40.50	$50.34	$48.94	$57.46
Retail Trade	$16.15	$16.47	$16.15	$17.71	$19.11	$20.23	$19.53
Transportation and Warehousing	$35.09	$33.27	$32.08	$34.00	$35.86	$36.82	$37.34
Information and Cultural Industries	$40.49	$55.59	$60.91	$60.61	$58.93	$59.18	$68.54
Finance, Insurance, Real Estate and Leasing	$129.07	$124.85	$130.81	$133.56	$143.56	$147.07	$141.10
Professional, Scientific and Technical Services	$26.00	$24.24	$24.44	$25.04	$27.18	$29.35	$29.96
Administrative, Support Services and Waste Management	$20.57	$19.05	$22.60	$26.97	$24.52	$22.49	$23.18
Educational Services	$27.98	$25.31	$26.50	$25.16	$26.32	$26.59	$28.36
Health Care and Social Assistance	$19.10	$19.34	$19.85	$21.32	$22.54	$23.17	$23.48
Arts, Entertainment and Recreation	$16.09	$14.49	$14.51	$15.16	$16.49	$16.11	$14.75
Accommodation and Food Services	$15.25	$16.51	$15.71	$16.36	$17.11	$16.70	$17.21
Other Services	$15.76	$18.13	$18.04	$19.20	$20.24	$20.67	$21.36
Public Administration	$35.87	$41.08	$42.83	$41.10	$43.06	$40.14	$42.21

Source: Centre for the Study of Living Standards (CSLS)

Appendix B

Alberta Real GDP per Worker by Industry in 1997 Constant Dollars, 1998-2004

	1998	1999	2000	2001	2002	2003	2004
All Industries	$70,762.62	$70,637.08	$73,250.51	$72,539.33	$72,082.32	$72,341.29	$73,549.06
Agriculture, Fishing, Forestry and Hunting	$33,055.50	$40,207.09	$46,445.31	$46,219.63	$36,757.34	$39,188.92	$42,835.69
Mining and Oil & Gas Extraction	$249,253.04	$284,093.06	$267,185.38	$201,192.98	$204,260.82	$202,663.21	$189,159.18
Utilities	$294,376.34	$278,132.65	$233,567.80	$232,221.31	$170,807.23	$192,178.57	$191,949.64
Construction	$75,087.98	$67,015.37	$73,349.80	$77,891.60	$70,445.71	$68,535.76	$65,315.95
Manufacturing	$86,919.49	$80,510.37	$93,018.95	$86,826.27	$82,200.96	$86,222.30	$92,637.06
Wholesale Trade	$100,685.77	$82,860.35	$83,929.66	$83,771.47	$104,256.62	$99,346.67	$116,152.73
Retail Trade	$27,299.08	$27,842.67	$28,139.02	$30,057.62	$32,494.45	$32,905.08	$33,058.65
Transportation and Warehousing	$71,933.33	$69,085.90	$68,084.61	$71,043.17	$73,064.26	$74,803.46	$78,469.04
Information and Cultural Industries	$72,388.76	$98,186.19	$110,164.63	$106,944.75	$105,916.67	$104,493.80	$116,528.61
Finance, Insurance, Real Estate and Leasing	$227,411.45	$219,287.50	$235,669.63	$241,150.67	$259,423.03	$258,581.67	$254,534.44
Professional, Scientific and Technical Services	$49,364.22	$48,080.95	$48,296.16	$47,232.22	$51,389.07	$55,399.50	$56,790.04
Administrative, Support Services and Waste Management	$35,587.04	$33,206.29	$39,053.33	$46,105.93	$42,352.29	$38,774.72	$38,050.46
Educational Services	$44,019.35	$41,818.88	$44,736.63	$42,300.55	$43,251.13	$43,937.61	$44,881.76
Health Care and Social Assistance	$30,725.50	$31,478.96	$32,719.02	$35,691.59	$36,749.36	$37,788.51	$37,158.09
Arts, Entertainment and Recreation	$26,022.22	$23,608.11	$24,378.84	$24,832.26	$25,918.83	$24,925.15	$23,822.86
Accommodation and Food Services	$25,613.45	$26,571.29	$26,161.00	$27,658.32	$27,832.20	$27,118.37	$27,679.55
Other Services	$29,396.37	$32,150.20	$34,202.70	$36,195.12	$35,929.35	$36,525.69	$38,490.34
Public Administration	$64,421.72	$73,864.62	$78,462.52	$75,401.85	$76,944.62	$71,041.44	$74,383.52

Source: Centre for the Study of Living Standards (CSLS)

References

Sharpe, A. (2002). "Raising Canadian Living Standards: A Framework for Analysis." *International Productivity Monitor,* 5(Fall). Posted at www.csls.ca

Sharpe, A. (1998). *Productivity: Key to Economic Success*. Centre for the Study of Living Standards for the Atlantic Canada Opportunities Agency. Ottawa and Moncton, NB: CSLS and ACOA. Available at www.csls.ca